REMARKS/ARGUMENTS

Applicants have received and carefully reviewed the Office Action of the Examiner mailed August 20, 2004. Claims 1-22 are pending. Claim 16 has been amended as suggested by the Examiner to correct a typographical error. Claim 14 has been amended for clarity. New claims 21-22 have been added. Support for the new claims can be found in the specification and claims as originally filed. Typographical errors in the specification have been corrected. No new matter has been added. Reconsideration and reexamination are respectfully requested.

Specification Objections

Paragraphs 39 and 43 have been amended as suggested by the Examiner. Paragraphs 37 and 42 have also been amended to correct typographical errors in the reference numerals.

Drawing Objections

The drawings are objected to because the lines, numerals, and letters are poor in all figures. Applicant requests the drawings be replaced with the enclosed Formal Drawings.

Rejection under 35 U.S.C. § 112, second paragraph

Claims 14-15 are rejected as indefinite for lack of antecedent basis. Claim 14 has been amended to provide antecedent basis.

Rejection under 35 U.S.C. § 102(b)

Claims 1-4 and 18 are rejected as being anticipated by any one of Hartshorne, Wolfges, or Long et al. Claims 16 and 17 are rejected as being anticipated by Wolfges. The Examiner states that conduit 28 of Hartshorne, conduit 26 of Wolfges, and conduit 54 of Long et al. are read as a "third longitudinal cavity" as is recited in independent claim 1. Applicants respectfully traverse the rejection. Independent claim 1, as amended, recites, "wherein movement of the spool valve acts directly on a fluid contained in the third longitudinal cavity; and ... wherein

movement of the actuator acts directly on the fluid contained in the third longitudinal cavity" (emphasis added). Independent claim 1 recites an assembly in which the spool valve and solenoid actuator are fluidly, i.e., hydraulically, coupled. Hartshorne discloses a mechanically coupled armature acting on a control valve which is regulating the working valve. Hartshorne teaches mechanically coupling the armature (piston 16) to the spool valve 17, which causes friction and mechanical hysteresis. The instant invention solves this problem by hydraulically coupling the armature to the spool valve.

Additionally, in the pressure control valve of Hartshorne, the solenoid armature acts directly on the first piston 16, not on fluid in the passage 28. Furthermore, it appears that, in the device of Hartshorne, it is the fluid passing through passage 28 into and out of end chamber 30 that acts on and moves the second piston 17, rather than movement of the piston 17 acting directly on the fluid in a third longitudinal cavity, as is recited in claim 1. See column 4, lines 14-15 and 52-56, and column 5, lines 55-57. Hartshorne thus fails to teach each and every element of independent claim 1 and the claims dependent thereon. Withdrawal of the rejection is respectfully requested.

Wolfges discloses a pressure reducing valve in which a main piston 14 is located within a main valve 12, a solenoid 22 is coupled to the end of a pilot valve 11, and a control pressure line 26 joins the main valve 12 and pilot valve 11. See column 2, line 57 through column 3, line 8, and Figure 1. In the device of Wolfges, there does not appear to be a solenoid actuator that acts directly on fluid contained in a third longitudinal cavity to move a spool valve along the first longitudinal cavity, as is recited in independent claim 1. Wolfges thus fails to teach each and every element of independent claim 1, and claims dependent thereon. Withdrawal of the rejection is respectfully requested.

Long et al. disclose a self-diagnosing pressure regulator apparatus including a pressure regulator valve 14 and a solenoid valve 12. Long et al. disclose the solenoid valve 12 as including a fixed spool mechanism 36 and an armature (not shown in the figures) that is movably disposed within the spool mechanism. Long et al. disclose the solenoid armature as moving to selectively couple and uncouple ports 38 and 40 to variably exhaust the fluid pressure in the pilot

pressure passage 54. Thus, it appears that the solenoid armature moves to open a port for releasing fluid from the passage 54 through exhaust 32, but does not act directly on the fluid contained in passage 54 to move the spool 42. Long et al. thus fail to teach each and every element of independent claim 1, and the claims dependent thereon. Withdrawal of the rejection is respectfully requested.

Rejection under 35 U.S.C. § 103

Claims 5-11, 13-15, and 19-20 are rejected as being unpatentable over any one of Hartshorne, Wolfges, or Long et al. in view of the acknowledged prior art of Figure 6 of the instant application. Claim 12 is rejected as being unpatentable over either Hartshorne or Wolfges in view of the acknowledged prior art of Figure 6 of the instant application.

The Examiner acknowledges that none of the cited prior art references teaches a pressure sensor as claimed. The Examiner asserts that it would have been obvious to provide a pressure sensor to sense the pressure in the output conduit 24 of Hartshorne and 16 of Wolfges. The Examiner also asserts that it would have been obvious to place the pressure sensor in the feedback chamber 41 of Hartshorne, 37 of Wolfges, or 55 of Long et al. in order to avoid spurious pressure fluctuations in the main output conduit. Applicants respectfully disagree.

Hartshorne teaches a pressure control valve in a braking system. The Examiner asserts that it would have been obvious to place a pressure sensor in conduit 24 of the Hartshorne device in order to better control the output pressure of the device. However, conduit 24 of Hartshorne provides hydraulic fluid from the pressure control valve 6 to the brake 8. The entire disclosure of Hartshorne is directed to the operation of the pressure control valve 6 to control the pressure of fluid through the valve. There does not appear to be any reason for adding a pressure sensor to conduit 24. The Examiner's reasoning of controlling output pressure has already been achieved by the pressure control valve 6, involving the solenoid 20 and first 16 and second 17 pistons. It appears that adding a pressure sensor to conduit 24 of Hartshorne would be redundant. Thus, there is no motivation for one of ordinary skill in the art to modify the device of Hartshorne as suggested by the Examiner. Similarly, the device of Wolfges is a pressure-

reducing valve that already achieves control of output pressure. Applicants submit that there is no motivation for one of ordinary skill in the art to add a pressure sensor to the load port 16 of Wolfges, as asserted by the Examiner.

Long et al. disclose a self-diagnosing pressure regulator device in which a diagnostic switch 16 detects pressure and is activated when fluid is supplied to friction element 18. See column 3, lines 37-39, and column 4, lines 15-16 and 27-31. Long et al. also teach that the diagnostic switch 16 does not have to be expensive because it does not have to precisely detect a certain pressure level, but just has to distinguish between exhaust back-pressure and control pressure. See column 5, lines 21-26. Long et al. thus already provide means for sensing pressure at various points in the pressure regulating apparatus. There does not appear to be any motivation for one of ordinary skill in the art to add a further pressure sensor to the device of Long et al.

As stated above, Hartshorne, Wolfges, and Long et al. fail to teach the basic limitations of the claimed apparatus. Figure 6 of the instant application shows a prior art conventional arrangement for a control solenoid, with "a pressure sensor 108 in the flow path 110 between a conventional control valve 100 and the control chamber 112". See instant application paragraph 5, lines 1-2. Thus, any combination of Hartshorne, Wolfges, or Long et al. with the admitted prior art shown in Figure 6 of the instant application would result in a pressure sensor located in a similar control port structure. Such a modification would result in the pressure sensor being located in the control passage 28a of Long et al. As stated above, Long et al. already provide diagnostic switch 16 for controlling and monitoring the control pressure. Wolfges teaches a control pressure line 26, thus it appears a pressure sensor added in accordance with Figure 6 of the instant application would be placed in line 26. Similarly, the control passage in Hartshorne is passage 28. A pressure sensor added to the pressure line 26 of Wolfges or passage 28 in Hartshorne would not achieve the instant invention, in which a pressure sensor is positioned in the end cavity, as stated in claim 5. Thus, even if one were to modify the devices of Hartshorne, Wolfges, and Long et al. according to Figure 6 of the instant application, one does not achieve the instantly claimed invention.

The Examiner asserts that it would have been obvious to modify the devices of Hartshorne, Wolfges, and Long et al. with a pressure sensor in order to avoid spurious pressure fluctuations in the main output conduit. Such motivation appears to be found only in Applicant's own specification. The Examiner relies on Figure 6 (prior art) of the instant specification for modifying Hartshorne, Wolfges, and Long et al. Figure 6, however, clearly shows a pressure sensor in the pathway leading from the control chamber. The instant specification states that such prior art devices have problems with pressure fluctuations. As Applicant's own specification cannot properly provide the motivation for modifying the prior art, the Examiner must obtain such motivation from either another prior art reference or the knowledge of one skilled in the art. The Examiner has provided neither source for the motivation. Thus, the Examiner appears to be relying on Applicant's own specification, which is improper.

As none of Hartshorne, Wolfges, and Long et al. teaches each and every element of the claims, and no motivation is found for modifying their teachings to achieve the instantly claimed invention, Applicant respectfully requests the rejections be withdrawn.

Reconsideration and reexamination are respectfully requested. It is submitted that, in light of the above remarks, all pending claims 1-22 are now in condition for allowance. If a telephone interview would be of assistance, please contact the undersigned attorney at 612-677-9050.

Respectfully Submitted,
Richard A. Wade
By his attorney:

Date: December 20, 2004

Brian N. Tufte, Reg. No. 38,638
CROMPTON, SEAGER & TUFTE, LLC
1221 Nicollet Avenue, Suite 800
Minneapolis, Minnesota 55403-2420
Telephone: (612) 767-4574
Facsimile: (612) 359-9349

Drawings

Attached are 6 sheets of replacement drawings.

Attachment: 6 sheets replacement drawings